

## Now You Try It!

Use the space provided to work out the solution to the next example.

### Example A Using the Order of Operations with Real Numbers

Simplify:  $(1-3)^2 + |9-4^2| - 1^3$

## Looking Ahead

Your review of the order of operations will be helpful in evaluating functions. Evaluating the function  $g(x)$  in the following example involves exponents, multiplication, and subtraction, which must be done in the proper order.

### Example Preview

Determine  $g(x+a) - g(x)$  for the following function.

$$g(x) = 5x^2 - 4x$$

#### Solution

To determine  $g(x+a) - g(x)$ , we substitute the values in for every occurrence of  $x$ .

$$\begin{aligned} g(x+a) - g(x) &= (5(x+a)^2 - 4(x+a)) - (5x^2 - 4x) \\ &= 5(x^2 + 2ax + a^2) - 4(x+a) - (5x^2 - 4x) && \text{Apply the exponent.} \\ &= 5x^2 + 10ax + 5a^2 - 4x - 4a - 5x^2 + 4x && \text{Multiply across the parentheses.} \\ &= 10ax + 5a^2 - 4a && \text{Add and subtract.} \end{aligned}$$

## 4.R.1 Exercises

### Concept Check

**True/False.** Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

1. If there are no grouping symbols, multiplication should always be performed before addition.

2. When following the rules for order of operations, powers indicated by exponents should be evaluated last.
3. The square root symbol is a grouping symbol.
4. A well-known mnemonic device for remembering the rules for order of operations is SADMEP.

## Practice

Simplify.

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5. a.  $24 \div 4 \cdot 6$

b.  $24 \cdot 4 \div 6$

8.  $14 \cdot 3 \div (-2) - 6(4)$

9.  $|16 - 20| + (-10)^2 + 5^2$

6.  $15 \div (-3) \cdot 3 - 10$

10.  $6(13 - 15)^2 \cdot 8 \div 2^2 + 3(-1)$

7.  $3^2 \div (-9) \cdot (4 - 2^2) + 5(-2)$

11.  $8 - 9 \left[ (-39) \div (-13) + 7(-2) - (-2)^2 \right]$

## Applications

Solve.

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12. **Discounts:** The Matthews family, a family of 4, is planning a trip to New York City. During their visit, they want to see the Broadway play *Matilda*. The tickets cost \$102 each. The Matthews purchase the tickets online and the website charges a service fee of \$7.50 per ticket. The website is running a sale where the Matthews can get 10% off of their entire purchase.
- Write an expression to describe how much of a discount the Matthews will receive on their purchase.
  - What is the final purchase price of the tickets?
13. **Banking:** Dennis overdrew his checking account and ended up with a balance of  $-\$42$ . The bank charged a \$35 overdraft fee and an additional \$5 fee for every day the account was overdrawn. Dennis left his account overdrawn for 3 days.
- Write an expression to show the balance of Dennis's checking account after 3 days.
  - Simplify the expression in Part **a.** to find the balance of Dennis's checking account after 3 days.

## Writing & Thinking

14. Explain, in your own words, why the following expression cannot be evaluated.

$$(24 - 2^4) + 6(3 - 5) \div (3^2 - 9)$$

15. Consider any number between 0 and 1. If you square this number, will the result be larger or smaller than the original number? Is this always the case? Explain.